

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (*Currently Amended*) A method of compensating for a possible delay between two or more radio transmission paths in space diversity radio transmissions, said method comprises:

receiving a first analog signal;

receiving at least one second analog signal;

sampling said first analog signal and said at least one second analog signal ~~signals~~ to obtain a first digital signal and at least one second digital signal, respectively, a possible delay being present between the first digital signal and the at least one second digital signals ~~signals~~; and

sending said digital signals to respective equalizers;

delaying, in a digital manner, either one of said first digital signal or ~~and~~ said at least one second digital signal by a period equal to an integer multiple of the sampling period, and optionally

recovering, at equalization, the difference between the imposed delay and the real delay.

2. (*Previously Presented*) A method according to claim 1, wherein delaying comprises calculating the value of the integer multiple, wherein calculating the integer multiple comprises:

realizing delayed replicas $r_{1j}(kT_{sa}) = s_1(kT_{sa} - jT_{sa})$ and $r_{2i}(kT_{sa}) = s_2(kT_{sa} - iT_{sa})$ of said first and said at least second digital signals, with $0 \leq j \leq N_1$ and $0 \leq i \leq N_2$, N_1T_{sa} being the maximum assumable delay of the first signal with respect to the at least one second signal and

$N_2 T_{sa}$ being the maximum assumable delay of the at least one second signal with respect to the first signal;

calculating cross-correlations

$$xc_{1j} = E \left\{ \sum_m \sum_n a_n a_m^* g_2^* (kT_{sa} - mT) g_1 (kT_{sa} - nT - \tau - jT_{sa}) \right\} \text{ with } 0 \leq j \leq N_1,$$

$$xc_{2i} = E \left\{ \sum_m \sum_n a_m a_n^* g_1^* (kT_{sa} - nT - \tau) g_2 (kT_{sa} - mT - iT_{sa}) \right\} \text{ with } 0 \leq i \leq N_2,$$

between the various delayed replicated signals, where $*$ denotes the complex conjugate operation and $E\{\cdot\}$ the time average operation; and

deriving the maximum value of said cross-correlations as i and j vary, namely

$$M = \max_{i,j} \left(|xc_{1j}|^p, |xc_{2i}|^p \right) \text{ said maximum value corresponding to the value of the integer}$$

multiple.

3. (*Previously Presented*) A method according to claim 2, wherein the method further comprises selecting the delayed replica to be sent to said equalizers as a function of the information related to the maximum of the calculated cross-correlations.

4. (*Currently Amended*) An apparatus for compensating a delay between two or more radio transmission lines in space diversity radio transmissions, said apparatus comprising:

- means for receiving a first analog signal;
- means for receiving at least one second analog signal;
- means for sampling the first analog signal and the at least one second analog signal to obtain a first digital signal and at least one second digital signal, respectively, a delay being possibly present between the first digital signal and the at least one second digital signals;
- and
- equalizers receiving said digital signals at their respective inputs~~the input~~;
- means for delaying, in a digital manner, either one of said first digital signal or ~~and~~ said at least one second digital signal by a period equal to an integer multiple of the sampling period,
- and
- equalizer means capable of restoring the difference between an imposed delay and the real delay.

5. (*Previously Presented*) An apparatus according to claim 4, wherein said delay means comprise means for calculating the value of the integer multiple, wherein said calculation means comprise:

means for realizing delayed replicas $r_{1j}(kT_{sa}) = s_1(kT_{sa} - jT_{sa})$ and $r_{2i}(kT_{sa}) = s_2(kT_{sa} - iT_{sa})$ of said first and said at least one second digital signals, with $0 \leq j \leq N_1$ and $0 \leq i \leq N_2$, N_1T_{sa} being the maximum assumable delay of the first signal with respect to the at least one second signal and N_2T_{sa} being the maximum assumable delay of the at least one second signal with respect to the first signal;

means for calculating cross-correlations

$$xc_{1j} = E \left\{ \sum_m \sum_n a_n a_m^* g_2^*(kT_{sa} - mT) g_1(kT_{sa} - nT - \tau - jT_{sa}) \right\} \text{ with } 0 \leq j \leq N_1,$$

$$xc_{2i} = E \left\{ \sum_m \sum_n a_m a_n^* g_1^*(kT_{sa} - nT - \tau) g_2(kT_{sa} - mT - iT_{sa}) \right\} \text{ with } 0 \leq i \leq N_2$$

between the various delayed replicated signals, where $*$ denotes the complex conjugate operation and $E\{\cdot\}$ the time average operation; and

means for deriving a maximum value of said cross-correlations as i and j vary, namely

$$M = \max_{i,j} (|xc_{1j}|^p, |xc_{2i}|^p), \text{ said maximum value corresponding to the value of the integer}$$

multiple.

6. *(Previously Presented)* An apparatus according to claim 5, further comprising switching means for selecting a proper delayed replica to be sent to said equalizer means as a function of information related to the maximum of the cross-correlations calculated.

7. *(Previously Presented)* A computer program comprising computer program code means adapted to perform the method claimed in claim 1 when said program is run on a computer.

8. *(Previously Presented)* A computer-readable medium having a program recorded thereon, said computer-readable medium comprising computer program code means adapted to perform the method claimed in claim 1 when said program is run on a computer.

9. *(Currently Amended)* An apparatus for compensating a delay between two or more radio transmission lines in space diversity radio transmissions, said apparatus comprising:

a first receiver that receives a first analog signal;

a second receiver that receives at least one second analog signal;

a sampling circuit that samples the first analog signal and the at least one second analog signal to obtain a first digital signal and at least one second digital signal, respectively, a delay being possibly present between the first digital signal and the at least one second digital signals;

equalizers that receive said digital signals at their respective inputs;

a digital delay circuit that digitally delays either ~~one of~~ said first digital signal or ~~and~~ said at least one second digital signal by a period equal to an integer multiple of the sampling period, and

a restoring equalizer that restores the difference between an imposed delay and the real delay.

10. (*Currently Amended*) An apparatus according to claim 9, wherein said digital delay circuit comprises a calculation circuit for calculating the value of the integer multiple, wherein said calculation circuit:

a delay circuit that realizes ~~realize~~ delayed replicas $r_{1j}(kT_{sa}) = s_1(kT_{sa} - jT_{sa})$ and $r_{2i}(kT_{sa}) = s_2(kT_{sa} - iT_{sa})$ of said first and said at least one second digital signals, with $0 \leq j \leq N_1$ and $0 \leq i \leq N_2$, N_1T_{sa} being the maximum assumable delay of the first signal with respect to the at least one second signal and N_2T_{sa} being the maximum assumable delay of the at least one second signal with respect to the first signal;

a correlation circuit that calculates cross-correlations

$$xc_{1j} = E \left\{ \sum_m \sum_n a_n a_m^* g_2^*(kT_{sa} - mT) g_1(kT_{sa} - nT - \tau - jT_{sa}) \right\} \text{ with } 0 \leq j \leq N_1,$$

$$xc_{2i} = E \left\{ \sum_m \sum_n a_m a_n^* g_1^*(kT_{sa} - nT - \tau) g_2(kT_{sa} - mT - iT_{sa}) \right\} \text{ with } 0 \leq i \leq N_2$$

between the various delayed replicated signals, where $*$ denotes the complex conjugate operation and $E\{\}$ the time average operation; and

a maximum value circuit derives a maximum value of said cross-correlations as i and j vary, namely $M = \max_{i,j} (|xc_{1j}|^p, |xc_{2i}|^p)$, said maximum value corresponding to the value of the integer multiple.

11. (*Previously Presented*) An apparatus according to claim 10, further comprising a switch for selecting a proper delayed replica to be sent to said restoring equalizer as a function of information related to the maximum of the cross-correlations calculated.